We Claim:

1. An optical dispersion compensation device comprising a first optical compensation unit which applies non-linear dispersion compensation across a signal band, the first optical compensation unit being coupled to a second optical compensation unit which applies a degree of linear dispersion compensation across the signal band.

2. A device according to claim 1, in which the first optical compensation unit comprises a number of chirped Bragg gratings.

3. A device according to claim 1, in which the first optical compensation unit comprises an array of broadband chirped Bragg gratings, each having a different dispersion slope, and an optical device for selectively coupling one of the chirped Bragg gratings into an optical path.

4. A device according to claim 3, in which the respective dispersion slopes in the array of chirped Bragg gratings are centred about a pivotal point positioned substantially at the centre of the signal band.

5. A device according to claim 2 or 3, in which the or each chirped Bragg grating has a relatively high dispersion slope with relatively low linear dispersion.

6. A device according to claim 2 or 3, in which the or each chirped Bragg grating is a quadratic chirped grating.

7. A device according to claim 1, in which the first optical compensation unit comprises an array of dispersion compensation paths, each offering a different dispersion slope, and an optical device for selecting one of the dispersion compensation paths, wherein each dispersion compensation path comprises a number of chirped Bragg gratings.

8. A device according to claim 7, in which each dispersion compensation path comprises a single broadband chirped Bragg grating.

9. A device according to claim 7, in which each dispersion compensation path comprises a series of narrowband Bragg gratings, each grating being tuned to a different wavelength.

10. A device according to claim 9, in which the Bragg gratings are all linearly chirped, with each grating offering a different amount of dispersion.

11. A device according to claim 1, in which the second optical compensation unit comprises a number of linearly chirped Bragg gratings.

12. A device according to claim 1, in which the second optical compensation unit comprises an array of linearly chirped Bragg gratings, each offering a different degree of linear dispersion, and an optical switch for selectively coupling one of the linearly chirped Bragg gratings into an optical path.

13. A device according to claim 11, in which the or each linearly chirped Bragg grating introduces a degree of constant dispersion.

14. A device according to claim 1, comprising one or more optical circulators which couple light between the first optical compensation unit and the second optical compensation unit.

15. A device according to claim 14, comprising a four port optical circulator, wherein one port is coupled to the first optical compensation unit and an adjacent port is coupled to the second optical compensation unit.

16. A device according to claim 15, in which the remaining two ports of the four port optical circulator are coupled to a respective one of an optical input and an optical output of the optical dispersion compensation device.

17. A device according to claim 2, in which the or each Bragg grating is reflective.

18. A device according to claim 11, in which the or each Bragg grating is reflective.

19. A device according to claim 2, in which the or each Bragg grating is transmissive.

20. A device according to claim 11, in which the or each Bragg grating is transmissive.

21. A device according to claim 1, in which the first optical compensation unit comprises a number of dispersion compensating waveguides, with tailored dispersion characteristics.

22. A device according to claim 21, in which the dispersion compensating waveguide is a photonic crystal device.

23. A device according to claim 21, in which the waveguide operates in a higher order mode.

24. An optical communications network comprising a dispersion compensation device according to a selected one of claims 1 to 23.

25. A method of providing dispersion compensation comprising the steps of passing an optical signal through a first optical compensation unit which applies non-linear dispersion compensation across a signal band, and also passing the optical signal through a second optical compensation unit, coupled to the first optical compensation unit, which applies a degree of linear dispersion compensation across the signal band.

26. A method according to claim 25, in which the non-linear dispersion compensation is effected by passing the optical signal through a non-linear chirped Bragg grating having a predetermined dispersion slope.

27. A method according to claim 25, in which the linear dispersion compensation is effected by passing the optical signal through a linearly chirped Bragg grating offering a predetermined degree of linear dispersion.

28. A method according to claim 25, in which at least one of the first optical compensation unit and the second optical compensation unit comprises an array of Bragg gratings for effecting dispersion compensation and an optical switch, wherein the optical signal is selectively coupled to a desired Bragg grating by setting the switch state of the optical switch.

29. A method according to claim 25, in which light is coupled between the first optical compensation unit and the second optical compensation unit using an optical circulator.

30. A method according to claim 25, in which the first optical compensation unit applies dispersion slope compensation across the signal band to equalise residual dispersion slope and the second optical compensation unit applies a degree of linear compensation to effect linear dispersion compensation, thereby providing broadband dispersion compensation across the signal band.

31. An optical dispersion compensation device comprising an optical compensation unit which applies non-linear dispersion compensation across a signal band, the optical compensation unit including an array of optical dispersion compensating elements, each element having a different dispersion slope, and an optical switch for selectively coupling one of the optical dispersion compensating elements into an optical path.

32. A device according to claim 31, in which the optical dispersion compensating elements are non-linearly chirped Bragg gratings.

33. A device according to claim 31, in which the optical dispersion compensating elements are lengths of dispersion compensating waveguides, with tailored dispersion characteristics.

34. A device according to claim 33, in which the dispersion compensating waveguide is a photonic crystal device.

35. A device according to claim 33, in which the dispersion compensating waveguide is a higher order mode waveguide.